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Second record of the invasive gecko *Lepidodactylus lugubris* (Duméril & Bibron, 1836) (Squamata: Gekkonidae) from Venezuela

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Abstract: *Lepidodactylus lugubris* is a small gekkonid lizard, predominantly parthenogenetic, with a widespread distribution in Indian Ocean and Pacific Ocean islands, continental Asia, and well established exotic populations in the continental America and the Caribbean. Herein, we report the second inland locality for this gecko in Venezuela, extending its distribution ca. 126 km east from the only locality previously reported for the country (Naguanagua, Carabobo state). Based on the first record, the species was introduced in Venezuela at least seven years ago, but until now apparently remains uncommon and localized.

Key words: Mourning gecko; Gekkota; new record; exotic species; Costal Range

The Mourning Gecko or Common Smooth-Scaled Gecko, *Lepidodactylus lugubris* (Duméril & Bibron, 1836), is a small member of Gekkonidae. It is a predominantly parthenogenetic species, and many of their populations are composed by only female clones; other populations are bisexual or are even composed of triploid hybrids resulting from the crossing of parthenogenetic females and males of bisexual populations (or a cryptic species) (Cuéllar & Kluge 1972; Boissinot et al. 1997; Ineich 1999, 2015; Buden et al. 2014). This species is native from the Southwest Pacific, but actually has a widespread distribution to islands all over the Indian and Pacific oceans, coastal areas in Southeast Asia, and coastal areas in northeastern Australia and nearshore islands (Bauer & Henle 1994; Ineich 1999; Kraus 2009; Fitzsimons 2011; Meyer & Agnew 2013; Uetz et al. 2016).

Recently, Hoogmoed & Avila-Pires (2015) provided a detailed review of its distribution in the New World, covering localities in southern Florida (USA), the French island of Guadeloupe, Great Corn Island and southeastern Nicaragua, the Caribbean and Pacific coasts of Costa Rica and Panama, the Caribbean and the Pacific coasts of Colombia, the coast of northern Ecuador and the Galapagos, Paramaribo and the inland area of Brownberg in Suriname, and Belém in northern Brazil. Also, there are a few isolated inland localities east of the Andes in Ecuador and Colombia. For Venezuela, *Lepidodactylus lugubris* is only known for six female specimens collected in 2009 in an inland locality in Naguanagua, Carabobo state [ca. 515 m above sea level (a.s.l.)] (Guerreiro & Graterol 2011).

Herein, we report the second locality for *Lepidodactylus lugubris* from Venezuela. On 26 August 2016 at 19:30 h, a specimen of *L. lugubris* was observed on a balcony of an apartment in the first floor of a residential building in Caracas (Chopin Street, Edificio Arigunaga, Apartment N° 6, Colinas de Bello Monte, Distrito Capital, capital of Venezuela; 10.4887° N, –66.8809° W; 875 m a.s.l.). The specimen was photographed but could not be collected at that moment. Three days after, 29 August 2016 at 21:00 h, the individual was collected, and since then kept in captivity (Figures 1, 2). It is an adult female with two eggs on either side of the ventral cavity—clearly visible through the belly skin— and distinct endolymphatic sacs. The morphological characteristics of these specimen fits with the descriptions of *L. lugubris* found in Brown & Parker (1977), Bauer & Henle (1994), Savage (2002), Buden (2007) and Hoogmoed & Avila-Pires (2009), but also with the translation of the original description of the species offered by Amarasinghe et al. (2009). It is characterized by (1) a total length (TL) of 77.9 mm, snout-vent length (SVL) 39.6 mm; (2) body elongate and depressed; (3) dorsal scales small,

Figures 1–4. *Lepidodactylus lugubris* from Caracas, Venezuela. **1, 2.** Dorsal and lateral view of the adult female MHNLS 22556 (SVL 39.6 mm), collected on 29 August 2016. **3, 4.** Dorsal and lateral view of the juvenile MHNLS 22557 (SVL 27.1 mm), collected on 23 October 2016. Photos: J. Celsa Señaris (1–2) and Maria M. Aristeguieta (3–4).

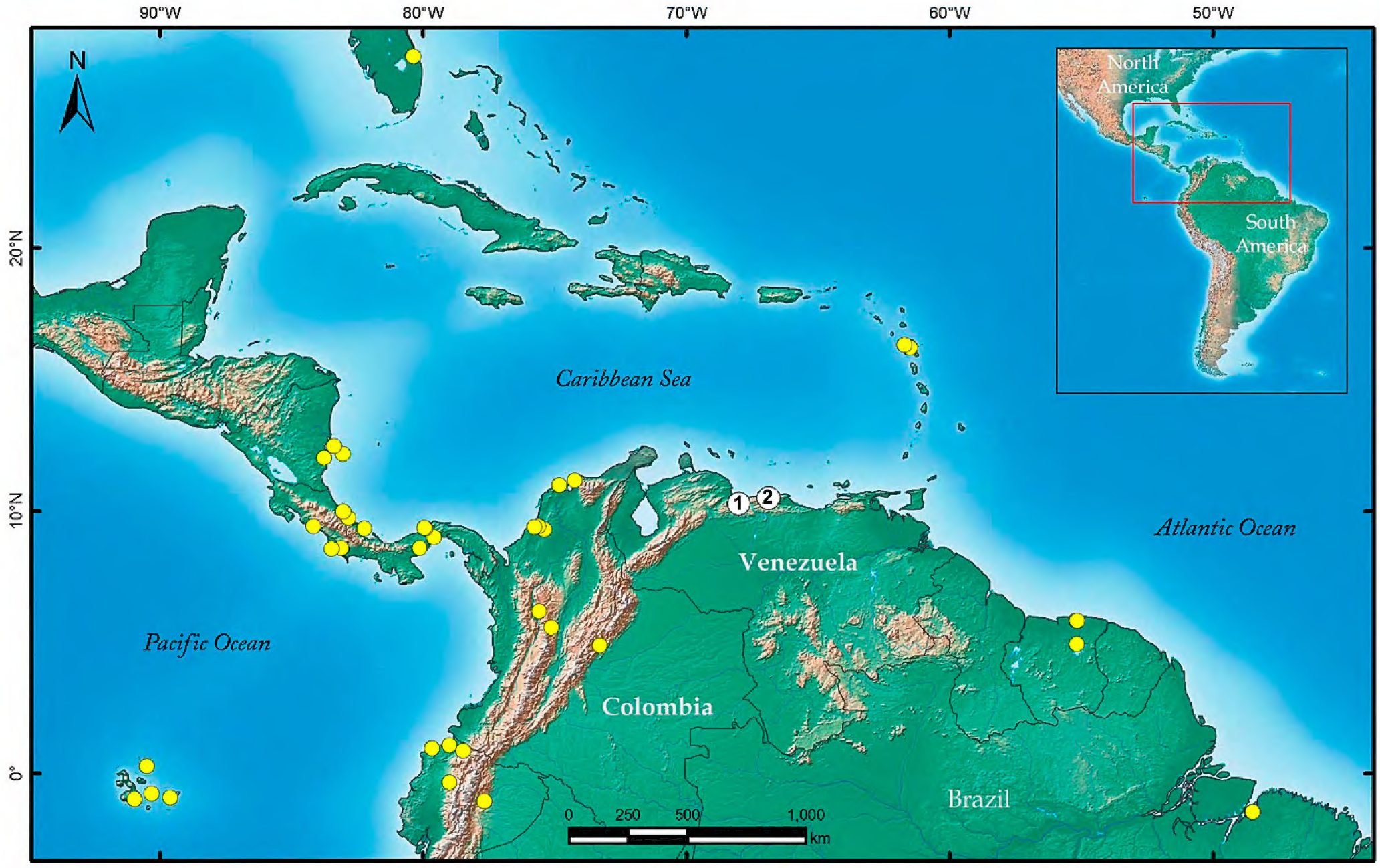

Figure 5. Map of Central America, Caribbean and northern South America, showing the distribution of the invasive gecko *Lepidodactylus lugubris* in the region. All non-Venezuelan records (unnumbered yellow circles) were taken from the compilation of HOOGMOED & AVILA-PIRES (2015). Venezuelan records (numbered circles): 1. Naguanagua, Carabobo state (GUERREIRO & GRATEROL 2011); 2. Caracas, Capital District (new record).

granular, and homogenous, no enlarged scales; (4) ventral scales flat, rounded, and imbricated, slight larger than dorsal scales; (5) depressed pentadactyl limbs; (6) fingers and toes depressed, basally webbed; (7) enlarged subdigital lamellae, undivided at the base and distal three divided forming a V-shaped figure; (8) digits with non-retractile claws; first digit clawless; (9) tail cylindrical, slightly flattened, covered with small scales, and with a lateral row of pointed scales increasing in size posteriorly; subcaudals somewhat enlarged; (10) eye with vertical pupil; upper eyelids without enlarged scales; (11) ear opening very small, oblique. Based on the life color pattern, this individual belongs to the widespread diploid parthenogenic Clone A (INEICH 1988, 1999). One month later, on 29 September, this female laid an oval white egg (9.4 × 6.8 mm), adhered to the glass terrarium wall.

On 12 September 2016 at 20:45 h, a second smaller individual of *L. lugubris* (apparently a juvenile because it's small size) was seen in the same balcony. In successive days the specimen was observed inside or close to a terrarium that housed a juvenile *Iguana iguana*, but they ran quickly to the surrounding plants and escape. Also, at the same moment, we saw two individuals of *Hemidactylus mabouia* (one adult and a juvenile), both collected. On 30 September at 21:40 h a third individual (presumably an adult due to its size) was observed in a crack in the wall at the entrance of the building site. During the daylight, in the same wall fissure, an adult male of *Gonatodes vittatus* had been seen daily for more than three months. Finally, on 23 October 2016 another specimen of *Lepidodactylus lugubris* (SVL 27.1 mm; tail length 27 mm) was collected in the same balcony, photographed (Figures 3–4), and preserved. The two specimens of *Lepidodactylus lugubris* collected were deposited in the Museo de Historia Natural La Salle (MHNLS) in Caracas, under the numbers MHNLS 22556 (adult female) and MHNLS 22557 (juvenile). Collecting permit #0941 (period 2016–2017) was issued to Fernando J. M. Rojas-Runjaic by the Ministerio del Poder Popular para Ecosocialismo y Aguas of Venezuela.

Lepidodactylus lugubris is a nocturnally active gecko, which feeds principally on insects but also on nectar and ripe fruit (SAVAGE 2002; NAFUS 2012). We suppose that we saw commonly specimens of the Mourning Gecko in the balcony, because they are attracted by the abundance of small fruit flies (*Drosophila* spp.) and the ripe fruit of our terrarium containing and *Iguana iguana* specimen. In this condition *L. lugubris* is sympatric with *Hemidactylus mabouia* (another Gekkonidae introduced in Caracas), but the latter has been established in this city at least three decades ago (RIVAS 2001) and is considerably more abundant.

The first report of *Lepidodactylus lugubris* for Venezuela was based in six specimens collected in 2009, near or hidden in the wrapper leaves senescent palms in a garden in

Naguanagua, Cararabobo state (Guerreiro & Graterol 2011). Our observations, seven years later, extend the species' distribution by ca. 126 km east (linear) from the only previous record for the country (Figure 5). This species may be much more widespread in Venezuela than known, and possibly has been confused with the exotic house geckos *Hemidactylus mabouia* and *H. frenatus,* both found in the country (Rivas et al. 2005) or with the native *H. palaichthus*, which is common in synanthropic situations in eastern, central and southern Venezuela. On the other hand, some studies have shown that direct or indirect interactions (predation of juveniles, competition, stress induced) with more aggressive and larger introduced geckos (*Hemidactylus* spp.) can reduce the population density, expansion, and establishment of *L. lugubris* (Bolger et al. 1992; Petren et al. 1993; Brown et al. 2002). Further research is needed to determinate if the Mourning Gecko has a greater distribution in the country, with additional well-established populations, or if conversely, no other introductions have been occurred, or have not prospered.

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